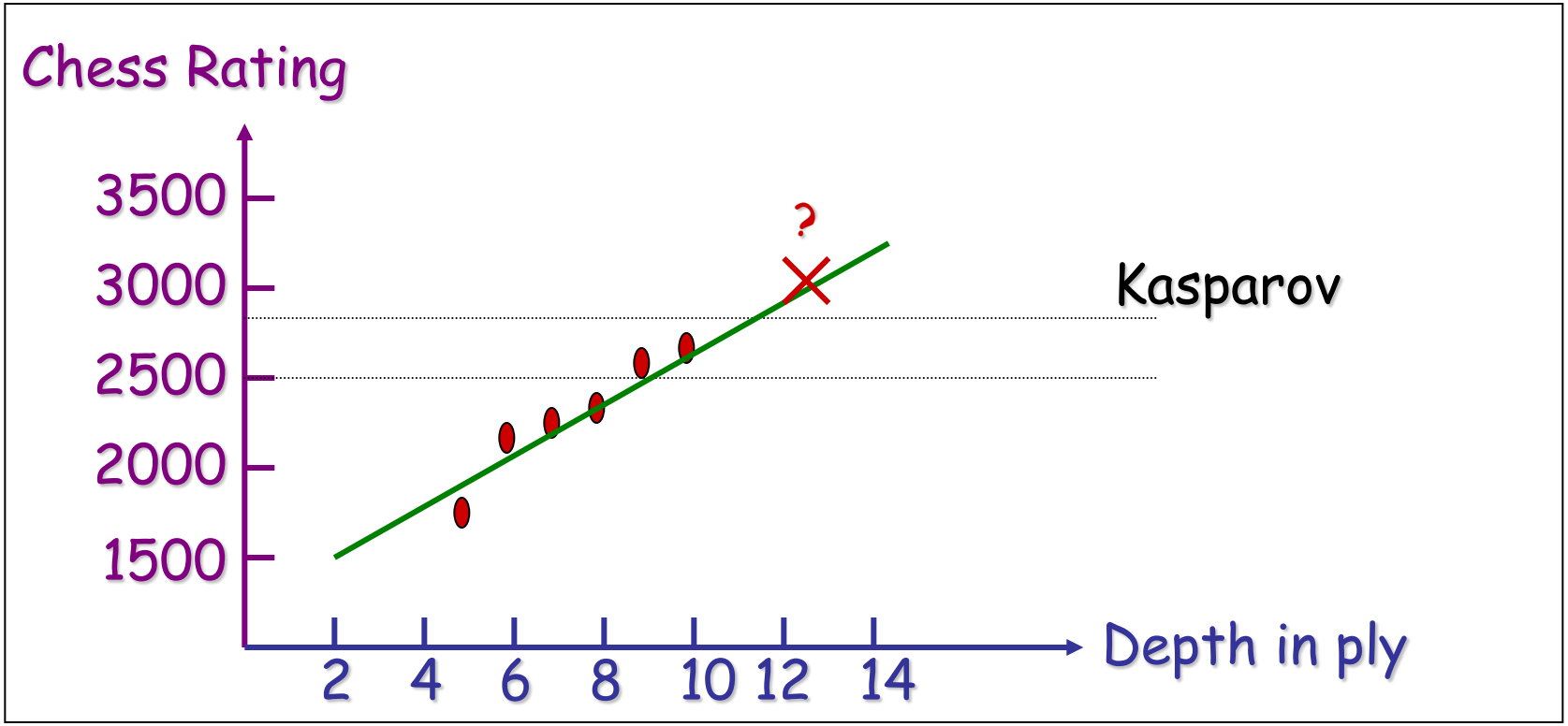
COMP 308 ARTIFICIAL INTELLIGENCE READING - DEEP BLUE DEFEATS KASPAROV

Garry Kasparov and Deep Blue. © 1997,
GM Gabriel Schwartzman's Chess Camera, courtesy IBM.

Win of deep blue predicted:

Computer chess ratings studied around 90ies:



Further increase of depth was likely to win !

A week before his showdown with Deep Blue, Garry Kasparov sat down to discuss the significance of the rematch.

Q: What is at stake here? Is it about more than money?

GK: It's about the supremacy of human beings over machines in purely intellectual fields. It's about defending human superiority in an area that defines human beings.

Q: Why should people who aren't necessarily fans of chess be interested in the event?

GK: Because it tells us where we stand in a world of intelligent machines. There is always a deep fascination in watching a battle between two different and rival systems. When Fischer played against Spassky it was the free world against communism. People who knew nothing about chess were deeply concerned about the outcome. People are even more concerned about the results of the battle between man and machine.

Q: Please describe your training routine for this match. How long have you been preparing? Where? What does the training consist of?

GK: How long have I been training for this match? One could argue all of my life! Actually, I have done intense general chess training for the last two years and in the last four weeks I have trained specifically for this match against the computer. It was done in Podolsk, which is just outside Moscow. Interestingly, I make a lot of use of computers in my training. I think the other side works more intensely with human beings.

In a shocking finale that lasted barely more than an hour, World Champion Garry Kasparov resigned 19 moves into Game 6, handing a historic victory to Deep Blue.

The win gave the IBM supercomputer a 3.5-2.5 victory in the six-game rematch. It was the first time a current world champion has lost a match to a computer opponent under tournament conditions.

"What we just witnessed was a landmark achievement in chess," said match commentator Yasser Seirawan. "All I can say is that I'm stunned. I absolutely didn't expect this to happen."

Kasparov, who afterward admitted he was in a poor frame of mind entering Game 6, fell into a well-known trap that has been established as a bad line to follow. According to commentators covering the match, it was almost inconceivable that someone of Kasparov's ability could allow this to happen.

It appeared that the pressure of the past five games had taken its toll on Kasparov. His disastrous mistake early in the game was certainly uncharacteristic of a man generally considered to be the greatest player in the history, and Kasparov's early resignation was a sign that he'd lost his will to fight. "For me, the match was over yesterday," he said. "I had no real strength left to fight. And today's win by Deep Blue was justified."

Game 6 began with a very quiet, positional-based opening, the Caro-Kann. Unlike in four of the previous five games, Kasparov, playing black, began with a "real" opening – one that wasn't specifically improvised to throw off Deep Blue -- but he then developed it into a losing variation.

Based on this beginning, the commentators predicted a strategic battle. Said Seirawan, "This is also a very solid set up for black."

That forecast quickly went out the window after Kasparov's seventh move, when Deep Blue sacrificed a knight for a pawn, costing Kasparov the ability to castle. At this point, Kasparov's disposition changed dramatically. "Kasparov has a look of terror on his face," said Seirawan. "He's showing his disbelief by falling for a well-known opening trap." The error provided Deep Blue with a highly advantageous position and marked the beginning of the end for Kasparov.

After the game, Deep Blue development team leader C.J. Tan expressed satisfaction with the result. He also pointed out that there was more to Deep Blue's battle with Garry Kasparov than just a game of chess. "We are very proud to have played a role in this historic event," he said. "This will benefit everyone -- from the audience to school children, to businesses everywhere, even to Garry Kasparov."

Kasparov, who on several occasions expressed unhappiness with the ground rules of the six-game rematch, challenged Deep Blue to a showdown under regular tournament conditions. "The match was lost by the world champion," he said, "but there are very good and very profound reasons for this. I think the competition has just started. This is just the beginning."

The Deep Blue development team took home the $700,000 first prize, while Kasparov received $400,000.

By his own admission, the pressure got to Garry Kasparov today. It was the not the $300,000 difference between first and second prize nor the massive media attention this match has received. It was Deep Blue's astonishing play the world champion could not come to terms with.

Kasparov was off-balance coming into this game, a man who, for once in his career, had let his emotions overcome the logical impulses of his own chess genius. Still smarting from his reverse in the second game, Kasparov had lost his objectivity and accepted his strategy has failed.

In a bizarre twist, Kasparov avoided his favorite opening moves and started to play like his longtime human rival, Anatoly Karpov, who loves to defend with an opening known as the Caro-Kann. This was a clear sign things were not right, but Deep Blue, naturally, did not notice and just played the standard moves. As early as move seven, Kasparov made a clear mistake allowing a sacrifice of a knight that is known to be very strong. A quick check of the computer chess databases showed that of the nine players who had allowed this sacrifice, only one had survived and he needed a large slice of luck.

With Deep Blue, luck does not come into it, and we witnessed the shortest ever game between man and machine at the top level. After just under an hour, Kasparov realized how hopeless his position had become. We did not have to wait long for the killer blow from Deep Blue that ended the game after just 19 moves and win the match 3.5-2.5.

The champion issued a challenge at the post game press conference: " It's time for Deep Blue to play real chess. I personally guarantee I will tear it in pieces." Fighting talk, and I fervently hope we will see Deep Blue participate in wider world of chess.

What has changed in the machine that lost last year ? The director of the IBM research team, C.J.Tan, explained: " Three things were improved this time around; it's more powerful, we added more chess knowledge and we developed a program to change the parameters in between each game. "

Kasparov is still in shock, and was in his hotel room last night studying printouts from the Deep Blue team that he hopes will give him some insights into its wonderful play that have entertained and will, in time, educate every chess player.

Vishwanathan Anand became India's first grandmaster in 1987. He met Garry Kasparov for the world championship in 1995 at the World Trade Center in New York. Kasparov retained the title, but Anand remains one of the world's elite chess players.

I eagerly waited to see the Kasparov vs. Deep Blue rematch. Deep Blue was stronger. Deeper, to be precise. From my own experience, practical play exposes all sorts of weaknesses and strengths in my play that are hidden during preparation. Equally, the team behind Deep Blue must have benefited immensely from studying the six games played against Kasparov in 1996. And it would be faster. I can't tell the difference between 100 zillion positions and 497 zillion positions, but if it helped Deep Blue play stronger, so be it. I was looking forward to Deep Blue boldly going where no man had gone before.

Kasparov himself must have studied the games played last year. However, humans can't change their style drastically like computers. On top of that, all his games were accessible to the Deep Blue team, while he was in the dark about Deep Blue. He had two options: to play like Kasparov or to play like "Mr. Anti Deep Blue." The former runs the risk of playing to the strengths of the machines, the latter that the human ends up as disoriented as the machine. Humans, too, play weaker in unfamiliar situations and though they may find their way around better, machines can compensate for that with brute force.

Kasparov chose the latter. Unfortunately, as a result, we were never able to see the fabulous calculating abilities of Deep Blue. Not once did we see a spectacular example of brute force producing a solution that differed significantly from that suggested by intuition. A lot has been made of Deep Blue's play in the second game, but in fact only one or two moments can be singled out - 26.f4 and 37.Bxe4. The rest of the game is not that difficult, even for a computer.

There is also the mystery at the end of the game. Did Deep Blue not see 45...Qe3? Why on Earth did it play 44.Kf1? Surely it could calculate 3 moves further!

His strategy might even have worked if he hadn't conceded so much territory to Deep Blue. By trying so hard to avoid any position where Deep Blue might be able to calculate its way through, he effectively self-destructed. Three tough draws followed where he was always better, but unable to overcome Deep Blue's stubborn defense. By the 6th game, he was a pale shadow of himself. Suffice it to say, that the trap he fell into in the 6th game is a well known one. It forms part of his own opening strategy as White!!

The chess may have been disappointing, but the media interest has been exceptional and that is a wonderful promotion for the game of chess

Deep Blue has only played twelve games in two years against one single opponent. As such, it is impossible to tell how strong it is or what it is capable of.

IBM can hardly risk the reputation of its "blue-eyed" baby against some PC or mere mortal. So the rest of us (6,000,000,000 minus Kasparov) are left with more questions than answers.

The following is a top ten listing of the dissimilarities between the way Garry Kasparov and Deep Blue play chess:

1. Deep Blue can examine and evaluate up to 200,000,000 chess positions per second

   Garry Kasparov can examine and evaluate up to three chess positions per second

2. Deep Blue has a small amount of chess knowledge and an enormous amount of calculation ability.

   Garry Kasparov has a large amount of chess knowledge and a somewhat smaller amount of calculation ability.

3. Garry Kasparov uses his tremendous sense of feeling and intuition to play world champion-calibre chess.

   Deep Blue is a machine that is incapable of feeling or intuition.

4. Deep Blue has benefitted from the guidance of five IBM research scientists and one international grandmaster.

   Garry Kasparov is guided by his coach Yuri Dokhoian and by his own driving passion play the finest chess in the world.

5. Garry Kasparov is able to learn and adapt very quickly from his own successes and mistakes.

   Deep Blue, as it stands today, is not a "learning system." It is therefore not capable of utilizing artificial intelligence to either learn from its opponent or "think" about the current position of the chessboard.

6. Deep Blue can never forget, be distracted or feel intimidated by external forces (such as Kasparov's infamous "stare").

   Garry Kasparov is an intense competitor, but he is still susceptible to human frailties such as fatigue, boredom and loss of concentration.

7. Deep Blue is stunningly effective at solving chess problems, but it is less "intelligent" than even the stupidest human.

   Garry Kasparov is highly intelligent. He has authored three books, speaks a variety of languages, is active politically and is a regular guest speaker at international conferences.

8. Any changes in the way Deep Blue plays chess must be performed by the members of the development team between games.

   Garry Kasparov can alter the way he plays at any time before, during, and/or after each game.

9. Garry Kasparov is skilled at evaluating his opponent, sensing their weaknesses, then taking advantage of those weaknesses.

   While Deep Blue is quite adept at evaluating chess positions, it cannot evaluate its opponent's weaknesses.

10. Garry Kasparov is able to determine his next move by selectively searching through the possible positions.

    Deep Blue must conduct a very thorough search into the possible positions to determine the most optimal move (which isn't so bad when you can search up to 200 million positions per second).